

(B) AMENDMENTS TO THE CLAIMS

Please amend the claims in accordance with the following complete listing of claims:

Claim 1 (original): A method of producing natural gas from a well extending from ground surface into a subsurface production zone within a production formation, wherein:

- (a) the wellbore is lined with a casing, said casing having perforations in the production zone;
- (b) a tubing string extends through the casing and terminates adjacent to the production zone above the bottom of the wellbore; and
- (c) said casing defines an annulus between the tubing and the casing, the bottoms of said annulus and casing being in fluid communication with the well bore;

said method comprising the steps of:

- (d) determining a minimum total gas flow rate for the well;
- (e) injecting a pressurized injection gas into an injection chamber selected from the annulus and tubing, so as to induce flow of a gas stream up a production chamber selected from the annulus and the tubing, said production chamber not being the injection chamber, said gas stream comprising a mixture of the injection gas and production gas entering the wellbore from the formation through the casing perforations;
- (f) measuring the actual total gas flow rate in the production chamber;
- (g) comparing the measured total gas flow rate to the minimum total flow rate;
- (h) determining the minimum gas injection rate required to maintain the total flow rate at or above the minimum total flow rate, according to whether and by how much the measured total flow rate exceeds the minimum total flow rate; and
- (i) adjusting the gas injection rate to a rate not less than the minimum gas injection rate.

Claim 2 (original): The method of Claim 1 wherein the injection gas is a hydrocarbon gas.

Claim 3 (original): The method of Claim 2 wherein the hydrocarbon gas is recirculated production gas from the well.

Claim 4 (original): The method of Claim 1 wherein at least one of the steps of:

- (a) measuring the actual total gas flow rate;
- (b) comparing the measured total flow rate to the minimum total flow rate;
- (c) determining a minimum gas injection rate; and
- (d) adjusting the gas injection rate;

is repeated at selected time intervals.

Claim 5 (original): The method of Claim 1 wherein the steps of:

- (a) measuring the actual total gas flow rate;
- (b) comparing the measured gas flow rate to the minimum total flow rate;
- (c) determining a minimum gas injection rate; and
- (d) adjusting the gas injection rate;

are carried out empirically in trial-and-error fashion by manual adjustment of a throttling valve adapted to regulate the gas injection rate.

Claim 6 (original): The method of Claim 1 wherein the step of determining a minimum total flow rate is repeated at selected time intervals.

Claim 7 (original): The method of Claim 1 used in association with a liquid loaded well, and further comprising the step of injecting gas into the well under sufficient pressure as to force a portion of the liquids accumulated in the bottom of the wellbore through the casing perforations and back into the formation.

Claim 8 (original): An apparatus for use in producing natural gas from a well extending from ground surface into a subsurface production zone within a production formation, wherein:

- (a) the wellbore is lined with a casing, said casing having perforations in the production zone;
- (b) a tubing string extends through the casing and terminates adjacent to the production zone above the bottom of the wellbore; and
- (c) said casing defines an annulus between the tubing and the casing, the bottoms of said annulus and casing being in fluid communication with the well bore;

said apparatus comprising:

- (d) a gas compressor having a suction manifold and a discharge manifold;
- (e) an upstream gas production pipeline having a first end connected in fluid communication with the upper end of a production chamber selected from the tubing and the annulus, and a second end connected in fluid communication with the suction manifold of the compressor;
- (f) a downstream gas production pipeline having a first end connected in fluid communication with the discharge manifold;
- (g) a gas injection pipeline having a first end connected to and in fluid communication with the production pipeline at a point downstream of the compressor, and a second end connected in fluid communication with an injection chamber selected from the tubing and the annulus, said injection chamber not being the production chamber; and
- (h) a choke, for regulating the flow of gas in the injection pipeline.

Claim 9 (original): The apparatus of Claim 8, further comprising a flow meter for measuring gas flow in the production chamber.

Claim 10 (original): The apparatus of Claim 9, further comprising a flow controller associated with the flow meter, said flow controller having means for operating the choke.

Claim 11 (original): The apparatus of Claim 10 wherein the flow controller is a pneumatically-actuated flow controller.

Claim 12 (original): The apparatus of Claim 10 wherein the flow controller comprises a computer with a memory, and wherein:

- (a) the flow controller is adapted to receive gas flow data from the flow meter, corresponding to total gas flow rates in the production chamber;
- (b) the memory is adapted to store a minimum total flow rate;
- (c) the computer is programmed to:
 - c.1 compare a total gas flow rate measured by the meter against the minimum total flow rate; and
 - c.2 determine a minimum gas injection rate necessary to maintain the total gas flow rate in the production chamber at or above the minimum total flow rate; and
- (d) the flow controller is adapted to automatically set the choke to permit gas flow into the injection chamber at a rate not less than the minimum gas injection rate.

Claim 13 (original): The apparatus of Claim 9 wherein the meter is installed in the production pipeline at a point downstream of the compressor.

Claim 14 (original): The apparatus of Claim 9 wherein the meter is installed in the production pipeline at a point upstream of the compressor.

Claim 15 (original): The apparatus of Claim 8 wherein the production chamber is the tubing, and the injection chamber is the annulus.

Claim 16 (original): The apparatus of Claim 8 wherein the production chamber is the annulus, and the injection chamber is the tubing.

Claim 17 (original): The apparatus of Claim 8, further comprising an oxygen sensor adapted to detect the presence of oxygen within the production pipeline and to automatically shut down the compressor upon so detecting oxygen.

Claim 18 (original): The apparatus of Claim 8, further comprising a back-pressure valve in the production pipeline at a point downstream of the intersection between the gas injection pipeline and the production pipeline.

Claim 19 (currently amended): An apparatus for use in producing natural gas from a well extending from ground surface into a subsurface production zone within a production formation, wherein:

- (a) the wellbore is lined with a casing, said casing having perforations in the production zone;
- (b) a tubing string extends through the casing and terminates adjacent to the production zone above the bottom of the wellbore;
- (c) said casing defines an annulus between the tubing and the casing, the bottoms of said annulus and casing being in fluid communication with the well bore; and
- (d) a gas production pipeline is connected in fluid communication with the upper end of a production chamber selected from the tubing and the annulus;

said apparatus comprising:

- (e) a gas injection pipeline having a first end in fluid communication with a source of pressurized injection gas, and a second end in fluid communication with an injection chamber selected from the tubing and the annulus, said injection chamber not being the production chamber;
- (f) gas injection means, for pumping injection gas through the injection pipeline into the injection chamber; ~~and~~
- (g) a choke associated with the injection pipeline, for regulating the flow of gas in the injection ~~pipeline~~ pipeline;

- (h) a flow meter for measuring gas flow in the production chamber; and
- (i) a flow controller associated with the flow meter, wherein said flow controller comprises means for operating the choke and further comprises a computer with a memory, and wherein:
 - i.1 the flow controller is adapted to receive gas flow data from the meter, corresponding to total gas flow rates in the production chamber;
 - i.2 the memory is adapted to store a minimum total flow rate;
 - i.3 the computer is programmed to:
 - A. compare a total gas flow rate measured by the meter against the minimum total flow rate; and
 - B. determine a minimum gas injection rate necessary to maintain the total gas flow rate in the production chamber at or above the minimum total flow rate; and
 - i.4 the flow controller is adapted to automatically set the choke to permit gas flow into the injection chamber at a rate not less than the minimum gas injection rate.

Claims 20-21 (cancelled)

Claim 22 (currently amended): The apparatus of Claim ~~24~~ 19 wherein the flow controller is a pneumatically-actuated flow controller.

Claim 23 (cancelled)

Claim 24 (original): The apparatus of Claim 19 wherein the injection gas is a hydrocarbon gas.

Claim 25 (original): The apparatus of Claim 19 wherein the injection gas is recirculated production gas from the well.

Claim 26 (original): The apparatus of Claim 19 wherein the production chamber is the tubing, and the injection chamber is the annulus.

Claim 27 (original): The apparatus of Claim 19 wherein the production chamber is the annulus, and the injection chamber is the tubing.

Claim 28 (currently amended): An apparatus for producing natural gas from a well extending from ground surface into a subsurface production zone within a production formation, wherein:

- (a) the wellbore is lined with a casing, said casing having perforations in the production zone;
- (b) a tubing string extends through the casing and terminates adjacent to the production zone above the bottom of the wellbore;
- (c) said casing defines an annulus between the tubing and the casing, the bottoms of said annulus and casing being in fluid communication with the well bore; and
- (d) a gas production pipeline is connected in fluid communication with the upper end of a production chamber selected from the tubing and the annulus;

said apparatus comprising:

- (e) a gas injection pipeline having a first end connected in fluid communication with a source of pressurized injection gas, and a second end connected in fluid communication with an injection chamber selected from the tubing and the annulus, said injection chamber not being the production chamber; ~~and~~
- (f) a choke associated with the injection pipeline, for regulating the flow of gas in the injection ~~pipeline~~ pipeline;
- (g) a flow meter for measuring gas flow in the production chamber; and
- (h) a flow controller associated with the flow meter, wherein said flow controller comprises means for operating the choke and further comprises a computer with a memory, and wherein:

- h.1 the flow controller is adapted to receive gas flow data from the meter, corresponding to total gas flow rates in the production chamber;
- h.2 the memory is adapted to store a minimum total flow rate;
- h.3 the computer is programmed to:
 - A. compare a total gas flow rate measured by the meter against the minimum total flow rate; and
 - B. determine a minimum gas injection rate necessary to maintain the total gas flow rate in the production chamber at or above the minimum total flow rate; and
- h.4 the flow controller is adapted to automatically set the choke to permit gas flow into the injection chamber at a rate not less than the minimum gas injection rate.

Claim 29 (cancelled)

Claim 30 (currently amended): The apparatus of Claim ~~29~~ 28 wherein the flow controller is a pneumatically-actuated flow controller.

Claim 31 (cancelled)

Claim 32 (original): The method of Claim 28 wherein the injection gas is a hydrocarbon gas,

Claim 33 (original): The apparatus of Claim 28 wherein the injection gas is recirculated production gas from the well.

Claim 34 (original): The apparatus of Claim 28 wherein the production chamber is the tubing, and the injection chamber is the annulus.

Claim 35 (original): The apparatus of Claim 28 wherein the production chamber is the annulus, and the injection chamber is the tubing.

Claim 36 (original): The apparatus of Claim 28, further comprising an oxygen sensor adapted to detect the presence of oxygen within the production pipeline and to automatically shut down the compressor upon so detecting oxygen.

Claim 37 (original): An apparatus for use in producing natural gas from a well extending from ground surface into a subsurface production zone within a production formation, wherein:

- (a) the wellbore is lined with a casing, said casing having perforations in the production zone;
- (b) a tubing string extends through the casing and terminates adjacent to the production zone above the bottom of the wellbore; and
- (c) said casing defines an annulus between the tubing and the casing, the bottoms of said annulus and casing being in fluid communication with the well bore;

said apparatus comprising:

- (d) a gas compressor having a suction manifold and a discharge manifold;
- (e) an upstream gas production pipeline having a first end connected in fluid communication with the upper end of a production chamber selected from the tubing and the annulus, and a second end connected in fluid communication with the suction manifold of the compressor;
- (f) a downstream gas production pipeline having a first end connected in fluid communication with the discharge manifold;
- (g) an auxiliary pipeline having a first end connected in fluid communication with the production pipeline at a point upstream of the compressor, and a second end connected in fluid communication with the production pipeline at a point downstream of the compressor;
- (h) a gas injection pipeline having a first end connected in fluid communication with the auxiliary pipeline, and a second end connected in fluid communication with

an injection chamber selected from the tubing and the annulus, said injection chamber not being the production chamber;

- (i) a choke mounted in the injection pipeline, for regulating the flow of gas in the injection pipeline;
- (j) a first flow valve mounted in the auxiliary pipeline between the point where the auxiliary pipeline connects with the production pipeline upstream of the compressor and the point where the injection pipeline connects with the auxiliary pipeline; and
- (k) a second flow valve mounted in the auxiliary pipeline between the point where the auxiliary pipeline connects with the production pipeline downstream of the compressor and the point where the injection pipeline connects with the auxiliary pipeline.

Claim 38 (original): The apparatus of Claim 37, further comprising a flow meter for measuring gas flow in the production chamber, and a flow controller associated with the flow meter, said flow controller having means for operating the choke.

Claim 39 (original): The apparatus of Claim 38 wherein the flow controller is a pneumatically-actuated flow controller.

Claim 40 (original): The apparatus of Claim 38 wherein the flow controller comprises a computer with a memory, and wherein:

- (a) the flow controller is adapted to receive gas flow data from the flow meter, corresponding to total gas flow rates in the production chamber;
- (b) the memory is adapted to store a minimum total flow rate;
- (c) the computer is programmed to:
 - c.1 compare a total gas flow rate measured by the meter against the minimum total flow rate; and

- c.2 determine a minimum gas injection rate necessary to maintain the total gas flow rate in the production chamber at or above the minimum total flow rate; and
- (d) the flow controller is adapted to automatically set the choke to permit gas flow into the injection chamber at a rate not less than the minimum gas injection rate.

Claim 41 (original): The apparatus of Claim 38 wherein the meter is installed in the production pipeline at a point downstream of the compressor.

Claim 42 (original): The apparatus of Claim 38 wherein the meter is installed in the production pipeline at a point upstream of the compressor.

Claim 43 (original): The apparatus of Claim 37 wherein the production chamber is the tubing, and the injection chamber is the annulus.

Claim 44 (original): The apparatus of Claim 37 wherein the production chamber is the annulus, and the injection chamber is the tubing.

Claim 45 (original): The apparatus of Claim 37, further comprising an oxygen sensor adapted to detect the presence of oxygen within the production pipeline and to automatically shut down the compressor upon so detecting oxygen.

Claim 46 (new): An apparatus for producing natural gas from a well extending from ground surface into a subsurface production zone within a production formation, wherein:

- (a) the wellbore is lined with a casing, said casing having perforations in the production zone;
- (e) a tubing string extends through the casing and terminates adjacent to the production zone above the bottom of the wellbore;
- (f) said casing defines an annulus between the tubing and the casing, the bottoms of said annulus and casing being in fluid communication with the well bore; and
- (g) a gas production pipeline is connected in fluid communication with the upper end of a production chamber selected from the tubing and the annulus;

said apparatus comprising:

- (e) a gas injection pipeline having a first end connected in fluid communication with a source of pressurized injection gas, and a second end connected in fluid communication with an injection chamber selected from the tubing and the annulus, said injection chamber not being the production chamber;
- (f) a choke associated with the injection pipeline, for regulating the flow of gas in the injection pipeline;
- (g) an oxygen sensor adapted to detect the presence of oxygen within the production pipeline and to automatically shut down the compressor upon so detecting oxygen.

Claim 47 (new): The apparatus of Claim 8 wherein the choke is located in the production pipeline at a point downstream of the point where the gas injection pipeline connects to the production pipeline.

Upon entry of the present amendments, the claims pending in the application will be **Claims 1-19, 22, 24-28, 30, and 32-47.**